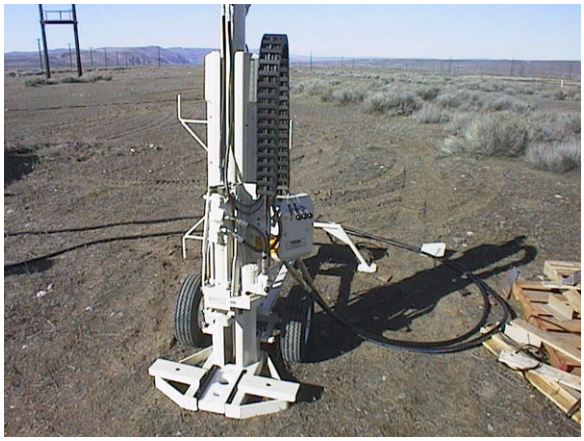
Technology Demonstration Fact Sheet
Compact Subsurface Soil Investigator



SUMMARY

The Hanford Site C Reactor Technology Demonstration Group demonstrated during the week of March 2, 1998, a compact subsurface soil investigation system for retrieving soil samples from below the Fuel Storage Basin concrete floor for laboratory analysis. All or part of the concrete basin is to be demolished. The soil sampler demonstrated for this sampling technology was a Geoprobe Model 540. Before Geoprobe's Model 540 was deployed, 8-inch diameter holes were core drilled in five randomly picked locations in the fuel basin's concrete floor slab to permit sampling probe access to the soil below.

The objective of the sampling effort was to obtain three samples at 5-ft and 10-ft depths from each hole at five different locations. In two sample holes, the sampling machine was able to penetrate to the full sampling depth of ten feet. In the remaining sample locations the sampler hit refusal at lesser depths, apparently because of encountering cobbles.

The Geoprobe, Model 540 is not able to penetrate or circumvent obstructions such as rocks, depending on their size and the angle encountered.

INNOVATIVE TECHNOLOGY DESCRIPTION

The technology demonstration was conducted in the fuel storage basin's concrete floor, where 8-inch diameter holes were core drilled in five randomly picked location. The compact sampling machine was lowered on to the fuel storage basin floor. The uniqueness of the soil sampling equipment is the compactness of the Geoprobe Model 540. The equipment fits in places that standard soil sampling equipment would not fit into for taking samples. The model 540 is equipped with two wheels and can be moved around similar to a cart. Two workers can move and set up the sampler in a short time. The unit hydraulically hammers and/or pushes a metal sampling tube into soil and hydraulically withdraws the sample to the surface. The diameters of typical sampling tubes are such that inner plastic sample holders are used that are 1.25" or 2" inside diameter. The length of sample that can be taken with each sample withdrawal is up to two ft.

The Geoprobe Model 540 is connected with flexible hydraulic hoses to a remote hydraulic power unit.

BASELINE TECHNOLOGY DESCRIPTION

The C Reactor Fuel Storage Basin is a concrete structure that is 22 ft below grade. Depending on the outcome of the soil samples and the RESRAD-Soil calculation, the basin could be completely removed if the basin leaked or just demolish the top 15 ft if the samples came back clean. For application of the baseline, part of the south fuel storage above grade wall and roof would have to be removed so as to obtain access for the truck-mounted geoprobe unit to the 5 randomly picked sample locations. Structure/loads studies to supporting the roof to utilize the truck-mounted geoprobe would be required for the 5 randomly picked sample locations. The following is the description of the truck-mounted geoprobe sample unit:

- Probing unit permanently mounted on full-size, 1-ton capacity, diesel-powered truck
- Total weight of unit equals approx. 5,700 lbs. (probe weight is 1,700 lbs., truck weight is ≈ 4,000 lbs.)
- Unit dimensions (including vehicle) approximately 22-ft. long, 8-ft wide, and 8-ft high
- Probing unit same as innovative unit
- All tooling and supplies stored on truck
- Two people needed to operate this unit most efficiently.

COMPARISON TO BASELINE

The compactness of the Geoprobe Model 540 permitted the sampling machine to be deployed directly on the basin floor between concrete curbs that have 34" clearance between pairs of curbs.

The baseline truck-mounted unit (with the same probe) would have required installations/supports for existing heavy-duty decking. The timing would not fit the scheduled date for taking samples, because sample analyses are needed for planning and decisions on whether removal of the bottom 7 ft of the basin is needed.

DETAILS OF BENEFITS

The Geoprobe Model 540 can be used in areas where a truck-mounted soil sampler does not have access.

SUCCESS CRITERIA

The Geoprobe Model 540 soil sampling equipment is only 31" wide, thereby permitting cost-effective sampling in a congested area.

SCHEDULE

The demonstration was conducted during March 1998.

FUTURE APPLICABILITY

The Geoprobe Model 540 sampling machine was purchased and will be deployed in other limited-access areas at the Hanford Site.

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